CLAIMS

What is claimed is:

1. An LED headlamp assembly comprising:

a lamp housing;

a carrier including a front side and a back side;

a heat sink thermally coupled to the back side of the carrier;

a plurality of LED units mounted to the front side of the carrier;

a flexible bellows attached to the carrier and the housing to allow the carrier to move independent of the housing;

a frame structure mounted to the housing adjacent to the back side of the carrier; and

at least one actuator and pivot rod mounted to the frame structure and coupled to the carrier, said actuator and pivot rod being operable to adjust the position of the carrier on the bellows.

2. The headlamp assembly according to claim 1 wherein the at least one actuator and pivot rod is two actuators and one pivot rod, said actuators and pivot rod moving the carrier on two axes.

3. The headlamp assembly according to claim 1 wherein the at least one actuator and pivot rod is one actuator and two pivot rods, said actuator and pivot rods moving the carrier on one axis.

4. The headlamp assembly according to claim 1 wherein the frame structure is a molded member.

5. The headlamp assembly according to claim 1 wherein the lamp housing is a single piece plastic molded member.

6. The headlamp assembly according to claim 1 wherein the heat sink includes a plurality of fins.

7. The headlamp assembly according to claim 1 wherein the bellows is attached to a flange on the carrier by a clip device and a flange on the housing by a clip device.

8. The headlamp assembly according to claim 7 wherein the bellows and the clip devices are co-molded together.

9. The headlamp assembly according to claim 1 further comprising an outer lens, said outer lens being mounted to the housing and defining a sealed enclosure in which the LED units are mounted.

10. The headlamp assembly according to claim 1 wherein the frame structure includes a series of cross-members.

11. The headlamp assembly according to claim 1 wherein the housing is mounted to the frame structure by bolts.

12. An LED headlamp assembly comprising:

a lamp housing;

a carrier including a front side and a back side;

a heat sink thermally coupled to the back side of the carrier, said heat sink including a plurality of fins;

a plurality of LED units mounted to the front side of the carrier;

a flexible bellows attached to the carrier and the housing to allow the carrier to move independent of the housing, said bellows being attached to a flange on the carrier by a clip device and a flange on the housing by a clip device;

a frame structure mounted to the housing adjacent to the back side of the carrier, said frame structure including a series of cross-members;

an outer lens mounted to the housing and defining a sealed enclosure in which the LED units are mounted; and

at least one actuator and pivot rod mounted to the frame structure and coupled to the carrier, said actuator and pivot rod being operable to adjust the position of the carrier on the bellows.

13. The headlamp assembly according to claim 12 wherein the at least one actuator and pivot rod is two actuators and one pivot rod, said actuators and pivot rod moving the carrier on two axes.

14. The headlamp assembly according to claim 12 wherein the at least one actuator and pivot rod is one actuator and two pivot rods, said actuator and pivot rods moving the carrier on one axis.

15. The headlamp assembly according to claim 12 wherein the frame structure is a molded member.

16. The headlamp assembly according to claim 12 wherein the lamp housing is a single piece plastic molded member.

17. The headlamp assembly according to claim 12 wherein the bellows and the clip devices are co-molded together.

18. The headlamp assembly according to claim 12 wherein the housing is mounted to the frame structure by bolts.

19. A method for providing an LED headlamp assembly, said method comprising:

providing a lamp housing;

providing a carrier including a front side and a back side;

thermally coupling a heat sink to the back side of the carrier;

mounting a plurality of LED units to the front side of the carrier;

attaching a flexible bellows to the carrier and the housing to allow the carrier to move independent of the housing;

mounting a frame structure to the housing adjacent to the back side of the carrier; and

coupling at least one actuator and pivot rod to the frame structure and the carrier for adjusting the position of the carrier on the bellows.

20. The method according to claim 19 wherein coupling the at least one actuator and pivot rod includes coupling two actuators and one pivot rod, said actuators and pivot rod moving the carrier on two axes.

21. The method according to claim 19 wherein coupling the at least one actuator and pivot rod includes coupling one actuators and two pivot rods, said actuator and pivot rods moving the carrier on one axis.

22. The method according to claim 19 wherein thermally coupling a heat sink includes thermally coupling a heat sink that includes a plurality of fins.

23. The method according to claim 19 wherein attaching a flexible bellows to the carrier and the housing includes attaching the bellows to a flange on the carrier by a clip device and a flange on the housing by a clip device.

24. The method according to claim 19 further comprising mounting an outer lens to the housing.